No.

Variety Protection Office

AXAAXAX



8400003

## HHE UNITED SHAMES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHAME COME;

## Idaho Agricultural Experiment Station

Concreas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

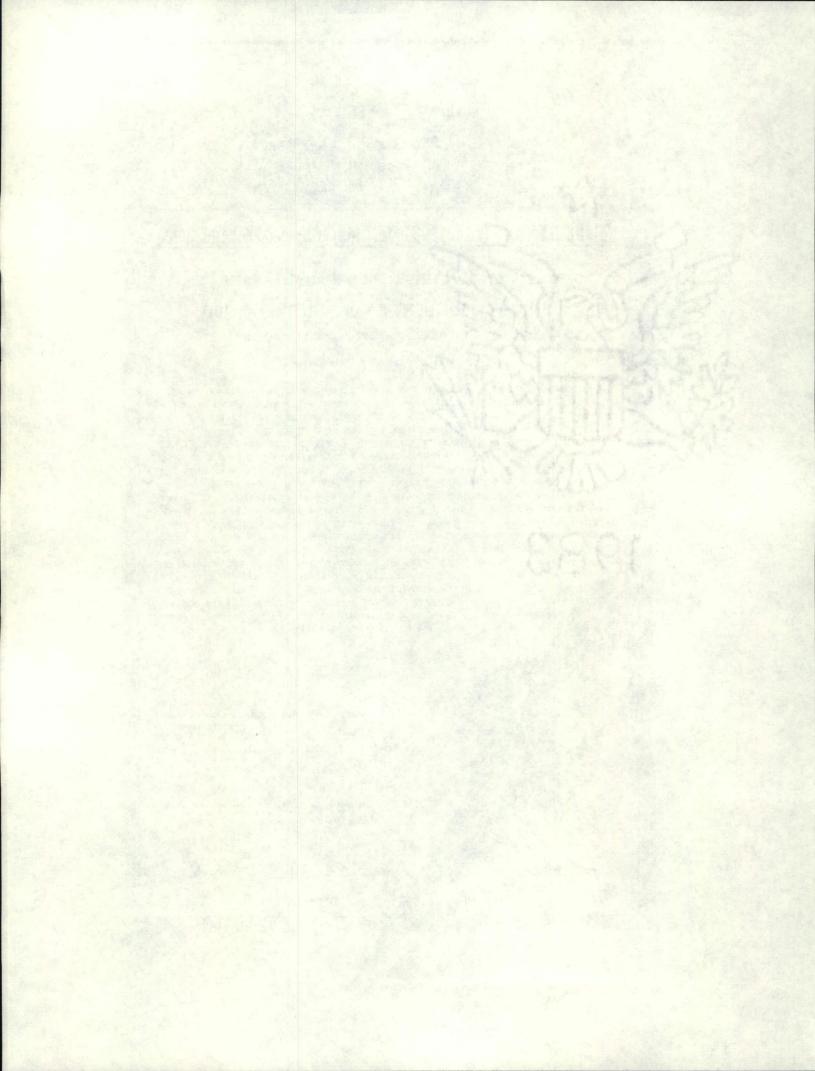
NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF eighteen YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, MPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT BY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

IDAHO FESCUE

'Joseph'

In Lestimony Watercot, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington this 28th day of September in the year of our Lord one thousand nine hundred and eighty-four.

The R Block Secretary of Agriculture



U.S. DEPARTMENT AGRICULTURAL MA	ARKETING SERV	VICE			RM APPROVED: OM	
LIVESTOCK, MEAT, GF				No	certificate for plant	variety protectio
APPLICATION FOR PLANT VARI	s on reverse)	CTION C	ERTIFICATE	catio	be issued unless a on form has been ro	eceived (5 U.S.C
1. NAME OF APPLICANT(S)		2. TEMPO	RARY DESIGNATION	3. \	ARIETY NAME	
R.D. Ensign	-t Ctation	C	LAI		Tananh	
Idaho Agricultural Experime  4. ADDRESS (Street and No. or R.F.D. No., City, Sta				-	Joseph	
Dep. Plant, Soils, and Entomo	logical Sc	1. PHONE	(Include area code)	PVP	O NUMBER	SEONLY
University of Idaho		208-88	5-6531		84000	102
Moscow, ID 83843					04000	103
6. GENUS AND SPECIES NAME Festuca idahoensis ELMER	7. FAMILY NA			0	DATE	
restuca Idanoensis EliEk	Grammea	e(Toacea		FILING	10/11/8:	
8. KIND NAME	9.	DATE OF I	ETERMINATION	-	12:30 A	
Idaho Fescue		June 1		۵	\$_1,000	
Idano rescue		Julie 1	.903	IVE	DATE	
10 IF THE APPLICANT NAMED IS NOT A UNE DOO				RECEIVED	10/11/8:	3
<ol> <li>IF THE APPLICANT NAMED IS NOT A "PERSO partnership, association, etc.)</li> </ol>		OF ORGAN	IZATION (Corporatio		s \$500.00	RTIFICATE
Same as above, item 1	•			FEES	DATE	
11. IF INCORDED ATT					9/11/8	+
11. IF INCORPORATED, GIVE STATE OF INCORPO	DRATION			12.	DATE OF INCORPO	RATION
Dep. Plant, Soils, and Entom University of Idaho Moscow, ID 83843						
14. CHECK APPROPRIATE BOX FOR EACH ATTAC	CHMENT SUBMIT	TTED				
a. Exhibit A, Origin and Breeding History of the Section 52 of the Plant Variety Protection Ac	e Variety (See	c.1 x	Exhibit C, Objective from Plant Variety P	Descrip rotection	tion of the Variety (R	equest form
b. X Exhibit B, Novelty Statement		d. 🗶	Exhibit D, Additiona	l Descri	ption of the Variety	
15. DOES THE APPLICANT(S) SPECIFY THAT SEEL SEED? (See Section 83(a) of the Plant Variety Pro	O OF THIS VARI	ETY BE SOL	D BY VARIETY NAM	1E ONL	Y AS A CLASS OF C	ERTIFIED
(est eterior os(a) of the 1 ant variety 170	rection Act.)	x	Yes (If "Yes," answer	r items 1	6 and 17 below)	☐ No
16. DOES THE APPLICANT(S) SPECIFY THAT THIS LIMITED AS TO NUMBER OF GENERATIONS?	VARIETY BE	17. IF	"YES" TO ITEM 16,	WHICH ED?	CLASSES OF PROD	UCTION
X Yes No		*	Foundation	R	egistered	X Certified
18. DID THE APPLICANT(S) FILE FOR PROTECTION	N OF THE VARI	ETY IN THE	U.S. OR OTHER CO	UNTRIE		
					of count	"Yes," give names tries and dates)
19. HAVE RIGHTS BEEN GRANTED IN THE U.S. OF	B OTHER COUNT	TRIES?			X No	
	TOTTLE COON	THIEST			Yes (If 'of count	Yes," give names ries and dates)
					X No	
20. The applicant(s) declare(s) that a viable sample plenished upon request in accordance with su	ch regulations a	s may be ap	plicable.			
The undersigned applicant(s) is (are) the owned distinct, uniform, and stable as required in Sevariety Protection Act.	er(s) of this sexu ction 41, and is	ually reprod entitled to	uced novel plant va protection under th	riety, a e provi	nd believe(s) that t sions of Section 42	he variety is of the Plant
Applicant(s) is (are) informed that false repres	sentation herein	can jeopar	dize protection and	result i	n penalties.	
SIGNATURE OF APPLICANT					ATE	
R.D. Ensign	riga	١			July 1, 1983	
SIGNATURE OF APPLICANT	1			DA	ATE	4
	•					1

FORM LMGS-470 (9-81) (Edition of 1-78 is obsc!ete)

## INSTRUCTIONS

General: Send an original copy of the application and exhibits, at least 2,500 viable seeds, and \$500 fee (\$250 filing fee and \$250 examination fee) to U.S. Department of Agricultural Marketing Service, Livestock, Meat, Grain and Seed Division, Plant Variety Protection Office, National Agricultural Library Building, Beltsville, Maryland 20705. (See section 180.175 of the Regulations and Rules of Practice.) Retain one copy for your files. All items on the face of the form are self-explanatory unless noted below.

### Item Give the date the applicant determined that he had a new variety based on (1) the definition in section 41(a) 9 of the Act and (2) the date a decision was made to increase the seed. Give: (1) the genealogy, including public and commercial varieties, lines, or clones used, and the breeding 14a method; (2) the details of subsequent stages of selection and multiplication; (3) the type and frequency of variants during reproduction and multiplication and state how these variants may be identified and (4) evidence of uniformity and stability. Give a summary statement of the variety's novelty. Clearly state how this novel variety may be distinguished 14b from all other varieties in the same crop. If the new variety most closely resembles one or a group of related varieties: (1) identify these varieties and state all differences objectively; (2) attach statistical data for characters expressed numerically and demonstrate that these differences are significant; and (3) submit, if helpful, seed and plant specimens or photographs of seed and plant comparisons clearly indicating novelty. Fill in the Exhibit C, Objective Description form, for all characteristics for which you have adequate data. 14c Describe any additional characteristics that are not described, or whose description cannot be accurately 14d conveyed in Exhibit C. Use comparative varieties as is necessary to reveal more accurately the description of characteristics that are difficult to describe, such as plant habit, plant color, disease resistance, etc. If "Yes" is specified (seed of this variety be sold by variety name only as a class of certified seed) the 15 applicant may NOT reverse his affirmative decision after the variety has either been sold and so labeled, his decision published, or the certificate has been issued. However, if the applicant specified "No," he may change his choice. (See section 180.16 of the Regulations and Rules of Practice.) See section 42 of the Plant Variety Protection Act and section 180.7 of the Regulations and Rules of 16 Practice.

EXHIBIT A

History of the Breeding and Development of 'Joseph' and 'Nezpurs' Idaho Fescue

The objective of the Idaho fescue (<u>Festuca idahoensis</u> ELMER) breeding and development program was to produce germplasm with improved <u>floret fertility</u> (seed set), <u>seed size</u> (seedling vigor), and higher germination. Idaho fescue has been noted for weakness in these three characteristics. The improved germplasm would produce more seed and more vigorous seedlings. This bunch-type grass may then have a more competitive advantage in re-establishment.

The breeding and selection procedures used in this program are summarized as follows:

Step I: In the 1950's, seed of approximately 89 native ecotypes were collected in various locations in Idaho, Oregon, Washington, Montana, Wyoming, California and the British Columbia and Saskatchewan providences of Canada. A source nursery of approximately 20 plants from each accession was established and the plants were evaluated for several botanical characteristics including floret fertility, seed size, and germination which were considered to be the important components to improve the biological efficiency of the species. It was noted from the early investigations that there was considerable variation among and within ecotypes in these components. The opportunity to select improved germplasm for these characteristics appeared promising.

Step II: A phenotypic recurrent selection breeding program was established whereby outstanding plants were selected based upon floret fertility, seed size, and germination. The basis of these indices were:

A STRUCKS

Through and the sufficient of the engineer

The department and the firm is not appropriately and the contract of the contr

I the true of the section of the sec

to a sequence of the sequence

The contributer test was a fact much those the contributer to the cont

The state of the s

Bud or with a company of the company

to the second of the second of

RECEIVED

THE OWNER

J - July best

- Floret fertility (seed set ratings) = wt. clean seed/10 panicles x 100 wt. 10 panicles
- Seed size = wt. in grams/200 seeds.
- Percentage Germination = number of seeds germinated, 100/panicle.
- Step III: The initial breeding nursery consisted of 182 progeny rows of 20 spaced plants each. These plants were selected from the source nursery. All plants were indexed for the three criteria described above. About 200 plants within the space planted nursery having the highest index ratings were retained in the nursery to interpollinate the following year. Thus, a majority of the plants were eliminated.
- Step IV: Seeds were harvested from the 200 plants or "clones" described above. This completed the first cycle of phenotypic recurrent selection.
- Step V: The second cycle was initiated by planting enough seeds, from Step V, in the greenhouse for space planting the second intercrossing nursery of 20 plants randomized in 4 replications of 5 plants each. Again, these plants were allowed to interpollinate and index readings were determined. The superior index ratings from the 200 "clones" were determined as in Step III. The clones giving the highest indexes were allowed to interpollinate and seed was harvested to complete the second cycle.
- Step VI: The third cycle of phenotypic recurrent selection was followed as described for the 1st and 2nd cycles.
- Step VII: After three cycles of recurrent selection was completed, 100 high indexed plants were identified. Although four original

from the iDs "classes" was dain sired as in Step ITE. The clopes,

Begins have the first out of the first o

possible synthetic combinations, A, B, C and D, were established, only Syn 'A' and Syn 'C' combinations were maintained in two isolated synthetic nurseries.

Each synthetic nursery consisted of 15 vegetative cuttings of each clone which were space planted in three replications with five plants per replication. The clones were randomized to assure maximum pollination. The two nurseries were isolated from other pollen sources.

## Syn 'A', 'Joseph'

This synthetic was a grouping of 13 clones from the 100 clones as identified above. All 13 clones were agronomically uniform in size, pollination dates, seed set potential, maturity and basal growth. They averaged 76 cm in height (range 72-80 cm), had 65% floret fertility, .33 g/200 seeds and germination of 91.4%. This was an 18.2%, 37% and 14% improvement when compared to the original plant ecotypes. (See Table 1).

## Syn 'C', 'Nezpurs'

This synthetic consisted of 90 clones from the final 100. Syn 'C' was phenotypically more variable than Syn 'A'. There was more variable plant height, clum and panicle color, basal growth and seed productivity (see Table 1). Syn 'C' plants are shorter (50-70 cm) and gave less forage yields. See Tables 2-6. Synthetic 'C', although superior in the three selection indices, was more variable as was noted in the original accessions. Some ecologists believe such variability is desirable for a species with such wide distribution and apparent adaptation.

praction and age, "C" constrains were delictions in the

We hard the control of the second consist of the control of the second o

apartic A. A. gar

In a combest of the algebra of 13 class from the 100 class of the contributed to the algebra of the contributed to the algebra of the contributed to the contributed

's tangent , it's .

restricted for the consistence of the characteristic states and the constitution of th

the grantee and the solven was the solven with the solven was the

Step VIII: Syn -1 or Breeders seed, consisting of equal portions of each clone, were harvested in 1981-82.

On June 16, 1982 the two cultivars, 'Joseph' and 'Nezpurs' was officially released and accepted for certification in Idaho. A limited generation system of seed certification consists of Breeders, Foundation, and Certified. The Idaho Agricutural Experiment Station will maintain the clones of each cultivar and will be responsible for the Breeders seed production at Moscow, Idaho. The Jacklin Seed Company of Post Falls, Idaho has been contracted to produce Foundation and Certified seed of 'Nezpurs'. and Grasslands West. Seed Co. of Culdesac, Idaho will produce the Foundation and Certified seed of 'Joseph'. They will be responsible for marketing the Certified seeds.

js/0927d

or a ville . Sym -t an Breedary actal, comment. in it equal more than or our comments of the comment of the com

and the transfer of the deposit of the section of t

Finite possibility of the set of the control of the finite of the set of the

Karana and Anna



EXHIBIT D

## Statement on Variety Stability

Idaho fescue, Festuca idahoensis ELMER is a widely distributed range grass species. Cytologically it's considered to be a polyploid with chromosome counts ranging from 14 to 16 pairs. Chromosome fragments, sometimes referred to as supernumerary chromosomes, are observed. Chromosome behavior among Festucas have been reported by several investigators.

In nature, Idaho fescue ecotypes are found among other fine leaf fescue species. For example, there were seed samples of  $\underline{F}$ . scabrella and  $\underline{F}$ . occidentalis in the early domestic collections for the breeding program. These plants were discarded in the breeding source nursery.

In the three cycles of phenotypic recurrent selection no unusual variants were observed among the populations. Some phenotypic variability characteristic of Idaho fescue was maintained.

'Joseph' and 'Nezpurs' were derived from a heterozygous heterogenous population which have been selected for homogenous characteristics of floret fertility, seedling vigor and germination. The difference between the two cultivars are given in EXHIBIT A and Tables 1 to 6.

In view of the limited three generation seed increase programs for these cultivars i.e. breeders to foundation to Certified seed, we would not expect to see significant change in these cultivars. Identity can also be traced through certification records.

d1/0936d

1011011

1104

Ly II. tath wester on Vertical Village and

This forces, ignines distinguish is a well to early interespending the configuration of the c

The private of the control of the co

the raw is an array of the respect of the respect of the restriction o

report to the sense of a more interest and the report of the manual and the report of the manual and the report of the sense of of th

La single file inches three governtion reading the spread to the surject to a single section of the surject to the surject tof

el resita

RECTIVED NOV SE 1983

2

#### NOVELITY STATEMENT

FOR

'Joseph' and 'Nezpurs' Idaho Fescue

'Joseph' and 'Nezpurs' Idaho fescue, <u>Festuca idahoensis</u>, <u>ELMER</u> are the first named cultivars of the species. They were developed in an attempt to improve seed productivity, germination, and seeding vigor. These characteristics are considered to be limiting survival factors among the native ecotypes of Idaho fescue as found throughout the northwest states.

Joseph (Syn A) and Nezpurs (Syn C) have been improved significantly in respect to floret fertility (seed set), seed size (vigor) and percent germination in comparison to a collection of the native ecotypes. (See Table 1, Exhibit D).

Joseph and Nezpurs are perennial fescues, have good drought tolerance, the basal leaves are densely tufted, are soft in the spring and fall but stiff during drought periods of the summers. The leaves are distinctive olive-green in comparison to the light to dark green of other fescues. Their leaf texture is similar to Durar hard fescue (Fig. 1b, Exhibit D). The basal tufted leaves of Joseph and Nezpurs resemble Covar sheep fescue and Durar hard fescue except for color. Basal leaf growth is greater for Joseph and Nezpurs than Covar but the leaf lengths are similar (See Table 3, Appendix D). The plant growth habit is erect for Joseph and Nezpurs but not as erect as for Covar and Durar. With respects to plant type (erectness and culm height) Joseph and Nezpurs resemble Highlight chewings fescue more than other fescues.

ANDREAL AL STEPHENS

2080

Joseph and Merp of Line featury Feature identific PLEER are the first manes cultivate, of the species. They were divided to an attempt to improve sends populatively, resimination, and sheddle it of These absorbed to a consider to an improve activity of a consider to an improve activity of activity and the continent states and iverselve accepts (Eya A) and Meridia (Eya C) have been into orad aircult to continent at a caspect to flores to the continent states to flores to the continent states.

bacal deaves are dones; turted, we soft in the secing multiplied at stiff during drought periods of the summers. The louwest and distinctive of we graed in conjunctive of the foreign to the light to dark green. The louwest describe the light to dark green. The louwest fearure the light to dark green. The lowest transfer to the first that the foreign and heaptra resemble from the epithesia described from the foreign and foreign the lowest for the foreign and heaptra to the plant for the first are controlled in the first and the first are controlled in the f

The seed culms at maturity of Joseph and Nezpurs are somewhat spreading with open panicles and spikelets at anthesis in contrast to more close spikelets and tight panicles of Covar and Durar (See Fig.'s 6-11, Exhibit D). Dawson red fescue panicles resemble Joseph and Nezpurs to a degree but it has dark green color of panicle basal leaves. The seedling growth of Joseph and Nezpurs compares to Covar and Durar but seedlings are not as vigorous as are 'Secar' bluebunch wheatgrass.

### Joseph vs. Nezpurs

Joseph is considered a narrow base synthetic of only 13-parental clones whereas Nezpurs is a wide based synthetic composed of 90 clones. The clones of Joseph are more uniform with respect to plant height and basal leaf growth whereas Nezpurs clones are more variable in plant type, plant size, and basal leaf growth. Joseph is 10-17 cm taller, more robust, more basal leaf growth, and slightly later in seed maturity than Nezpurs. The Joseph culms are more open and the larger panicles produce more and larger seeds. Nezpurs have hairs on the palea, longer lemma and awns, and have smaller panicles. (See section 16 in Exhibit C). The two cultivars provide a different degree of genetic variability. Some ecologists prefer the wide plant variability of Nezpurs although each of the parental clones making up Nezpurs were rated superior in floret fertility (seedset), seed size, and percent germination indexes of more than 2,000 plants.

The seconding at maturity of foseph and Mesourd are company aprending with open pagirlo, and spikelets at anthesis in contrast to more close satisficately and tight panishes of "over and Duran (Seconding to a degree that in he bowers of the second pagir to a degree that it has dark grown color of panish and heaves the second pagir to the town the following the company to the second pagir and the second pagir to the second

Joseph is considered a narrow busa composed of 17 parrotts edoned whereas Nosphraits a wite hand apprehe composed of 50 tones. The element of despit are more uniform with cospect to place had an and hash had accompany when a with purp close are more variable in plant type, right nize, and basis and around the composed and around the 10-11 of tailer and permits. The basis left growth and stightly taken in seed naturity than Mespuirs. The loseph coins are more open and the larger pant has produce more and the larger pant has produce and three seeds. Normars have had a to the calus, longer times and awas, and have smaller panticles. (See each more than the calus, longer times and awas, and have smaller panticles at See fearther wastafilty. See each of the parented of the parenter of the wine plant variability of the parented of the parenter and parent of parenter and more than the calus. Considering the second parenter and more than the calus.

FORM APPROVED: OMB NO. 0581-0055

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
LIVESTOCK, MEAT, GRAIN & SEED DIWISION
PLANT VARIETY PROTECTION OFFICE
BELTSVILLE, MARYLAND 20705

EXHIBIT C (Fine Leaved Fescues)

## OBJECTIVE DESCRIPTION OF VARIETY FINE LEAVED FESCUES

(Festuca spp.)

		restaca spp.,		
	APPLICANT(S) R.D. Ensign	TEMPORARY DESI	GNATION VARIET	YNAME
	daho Agricultural Exp. Sta.	Syn 'A'		FOR OFFICIAL USE ONLY
ADDRESS P	(Street and No. or R.F.D. No., City, State, and Zip Coolant, Soils, and Entonological Soniversity of Idaho oscow, ID 83843	ci.	PVPO NU	
or 0 9 be for SPAC	propriate number that describes the varietal character of the characteristics described including numerical measured PLANTS. Royal Horticultural Society or any reconstruction of the characteristics of the c	irements, should represe gnized color fan may be	nt those that are typic used to determine plan	al for the variety. Measured data should nt colors; designate system used:
1. SPECIES	: (With comparison varieties for use below - use varieti	es within species of app	lication variety)	
7	1 = F. rubra ssp. commutata (Chewings)	11 = Cascade 14 = Banner	12.= Highlight 15 = Barfalla	13 = Jamestown
	2 = F. rubra ssp. litoralis (Creeping Red)	21 = Dawson 24 = Pennlawn	22 = Starlight	23 = Merlin
	3 = F. rubra ssp. rubra (Spreading Red)	31 = Boreal 34 = Ensylva	32 = Ruby	33 = Fortress
	4 = F. ovina (Sheep)	41 = Covar		
	5 = F. longifolia (Hard)	51 = Durar	52 = Biljart (C-26)	53 = Scaldis
	6 = F. tenuifolia (Fine-Leaved Sheep)	61 = Panda	62 = Barok	
	7 = Other (Specify) F. <u>idahoensis(Nez</u>	purs)		
2. CYTOLO	DGY:			
2 8	Chromosome Number 2 Ploidy	1 = diploid 4 = octoploid	2 = tetraploid	3 = hexaploid
		n Central 2	acific N.W.	Other (Specify)
1 1		arly (Highlight) ate (Jamestown, Agram		dium Early (Boreal, Dawson) y Late
-	Date Headed	,		
<b>d</b> 1	Days earlier than	)		
6 0	Maturity same as	Comparison Variet	У	
	Days later than	)		
5. PLANT	HEIGHT: (At maturity; to top of panicle; Average of 1	10 tallest culms)		
7766 0	mm height			
0 7 3	mm shorter than 2 4	1		
	Height same as	Comparison Variet	У	
1 5 0	mm taller than	)		
6. GROWT	H HABIT: (Mature)			
1	1 = Erect (Ruby) 2 = Semi-erect (	(Highlight) 3	= Prostrate (Silvana)	
7. RHIZON	MES:		el.	
	mm Length mm Width	mm Inte	rnode length	
1	1 = Absent (Highlight) 2 = W 4 = Very Strongly Creeping (Fortress)	Veakly Creeping (Dawso	n) 3 = Stro	ongly Creeping (Boreal)

- 15. GIVE VARIETY OR VARIETIES THAT MOST CLOSELY RESEMBLE THE APPLICATION VARIETY. For the following characteristics indicate Degree of Resemblance by placing the column marked, D.R., one of the following numbers:
  - 1 = Application variety is less than comparison variety.

2 = Same As

3 = More than, better, greater, darker, more disease resistant, etc.

0 111010 11101, 001111, 3					
CHARACTER	VARIETY	D.R.	CHARACTER	VARIETY	D.R.
Rhizome Length None	highlight	2	Growth Habit Basa1	Covar	2
Leaf Width	Highlight	2	Leaf Color	Covar	1 More oliv
Panicle Color	Highlight	2	Panicle Shape	Pennlawn Highlight	2
Winter Color	covar	1	Cold Injury	Durar	2
Shade Tolerance	NA		Heat	Covar	2
⊡ ought	Covar	2	Disease*	Not Known	
-		:	L		

<sup>\*</sup> Specify each disease evaluated.

## 16. ADDITIONAL DESCRIPTION: (Use additional sheets as required)

Describe all characteristics that cannot be adequately described in the form above in Exhibit D. Comparative varieties should be used as may be appropriate, such as for disease. Append all comparative trial and evaluation data, including measured characters, environmental, and disease tests.

Idaho fescue, <u>Festuca idahoensis</u> Elmer although possessing some variability within the species as to plant type, height, basal growth, color, seed productivity, seed size, and vigor, it is a very distinctive species in comparison to other fine leaf fescues. The following indicate the similarities and differences of Joseph cultivar:

Joseph and Nezpurs are the first improved man developed cultivars.

For plant stature Joseph is sililiar to highlight; it's basal growth is similiar to Covar but the panicles of Joseph is more open and the spiklets of covar are smaller

and tighter gathered in the panicle.

The Dawson panicles are similiar in appearance to Joseph but Dawson is darker green in color; Joseph leaf color is an olive green whereas Durar are a shiny medium green. The most common appearance of Joseph at flowering stage is it's olive-green color, open panicle with spikelets spread up and down the rachis, the culms are open but mostly upright, the basal growth is definitely bunch-type and basal growth larger and denser in the fall/after the culms are removed. The leaves are glabrous, quite soft in the spring and fall but stiffer in the warm hot drought periods of the summer.

With respects of Nezpurs, Joseph is 10-17 cm taller, more basal density, no leaf hairs, larger panicles, slightly later in maturity, less overall plant variability(only 13 mother clones in the synthetic); the lemma and awns of Nezpurs are longer, palea have hairs and the seed and foliage weights are less for Nezpurs. See Nezpurs description for additional differences.

Table 1. Index readings for two synthetics, Syn 'A' and Syn 'C', of Festuca idahoensis Elmer after three cycles of genotypic recurrent selection

Synthetics	Fertility	Seed Size	Germ
	%	g/200 seeds	%
Syn 'A' 13 clones	65	.33	91.4
Range	49-82	.24-39	83-99
Syn'C' 90 clones	71.7	.31	89
byn o so crones	1-11	.51	09
Original clones	55	.24	80
Percent Improvement Over Original Plants			
Syn A	+18.2	+38	+14
Syn C	+30.4	+29	11

## BASIS OF INDICES

Seed Set Ratings (Floret Fertility = Wt. clean Seed/10 Panicles x 100)
Wt. 10 Panicles

Seed Size = Wt. in Grams/200 Seeds

Percentage Germination = No. Seeds Germinated/Panicle

tc:0934d

The interpretation of the synthetern, Synthetern Switter of the truncial formation of the synthetic of the s

	PLAS A	(Reported)

וים זו פול דשטוריים

"and deviate a loss contilles of the Control of the

Aug oby man, of the avia book

refered and arrived their of a notice have regular tree.

10:00:00



Table 2. Comparative Plant Characteristics of Idaho Fescues with other Fescues. 1980-81.

	Plant	Growth		Basa1		Seed	Weight
Cultivar	Height	Habit	Maturity	Growth	Forage	plant	panicle
	cm	-type-	date	-score-	g	g	g
Idaho Fescue, Syn 'A'	72-80	Erect1	5/112	7.03	7184	20.55	0.058
Idaho Fescue, Syn 'C'	55-70	Erect	5/10	6.3	194	12.7	0.082
'Covar', Sheep Fescue	60-62	V.Erect	5/12	6.0	68	6.9	0.021
'Durar' Hard Fescue	62-75	V.Erect	5/11	6.8	334	476	0.117
'Biljart', Hard Fescue	55-60	Semi-Erect	5/16	8.1	330	15.8	0.027
'Scaldis', Hard Fescue	55-65	Erect	5/11	8.5	378		0.047
'Pennlawn'. Cr. Red Fescue	75-92	Semi-Erect	5/19	8.9	449	39.1	0.145
'Dawson', Cr. Red Fescue	55-68	Semi-Erect	5/18	8.9	299	29.6	0.063
'Boreal', Dr. Red Fescue	75-80	Erect	5/17	7.5	373	40.1	0.085
'Jamestown', Ch. Red Fescue	65-70	Semi-Erect	5/17	7.0	334	_	0.089
'Cascade', Ch. Red Fescue	80-85	Semi-Erect	5/16	9.0	426	19.3	0.071
'Highlight' Ch. Red Fescue	35-40	Erect	5/17	_	_	_	_

<sup>1</sup> At maturity 2 At 50% heading; date 3 1 little; 9 abundant

<sup>4</sup> Representative spaced plants 80-81 5 Average of respresentative plants

Table 3. Comparative Leaf Data of Idaho Fescue With Other Fescues

	Leaf				She	ath			Basa1	Basal
Cultivar	Length	Width	Anthocyanin	Margin	Habit	Color	Ligule A	Auricles	Hairs	Growth
	cm	-mm-	est	-est-	-est-	-est-	-est-		-est-	-est-
Idaho Fescue, Syn 'A'	10.01	2	No <sup>2</sup>	Smooth <sup>3</sup>	Closed	White	Fi 1m <sup>4</sup>	none	Fine	7.05
Idaho Fescue, Syn 'C'	9.6	1	No	Smooth	Closed	White	Fi 1m	none	Yes	6.3
'Covar', Sheep Fescue	10.7	1	No	Smooth	Closed	White	Film-Large	none	No	6.0
'Durar', Hard Fescue	10.4	1	No	Smooth	Closed	White	Fleshy	none	No	6.8
'Biljart', Hard Fescue	11.3	1	No	Semi-rough	0pen	White	Fleshy	none	Fine	8.1
'Scaldis', Hard Fescue	11.7	1	No	Smooth	Open	White	Fi lm	none	Yes	8.5
'Pennlawn', Cr. Red Fescue	19.5	3	No	Smooth	Closed	White	Fleshy	none	Fine	8.9
'Dawson', Cr. Red Fescue	12.3	2 . !	5 No	Smooth	Closed	White	Fi 1m	none	No	8.9
'Boreal', Cr. Red Fescue	12.7	3	No	Smooth	Closed	White	Film- fleshy	none	No	7.5
'Jamestown', Ch. Red Fescu	e 11.3	3	Yes	Smooth	Open	Red	-	none	No	7.0
'Cascade', Ch. Red Fescue	13.0	2	No	Smooth	Open	White	Flat	none	No	9.0
'Highlight' Ch. Red Fescue	9.8	2	No	Smooth	Open	White	Film-thick	none	Fine	-

<sup>1</sup> Mature Spaced Plants
2 Anthocyanin present or absence
3 Smooth, Semi-Rough, or Rough
4 Filamentous-parchment, fleshy
5 Little, 9 abundant

Table 4. Comparative Panicle Characteristic of Idaho Fescues With Other Fescues

		Seed			Pa	nicle		
Cultivar	No/Plant	Yield	Length	Shape	Туре	Habit	Branches	Color
	no	g	cm	-est-	-est-	-est-	est	-est-
daho Fescue, Syn 'A'	245	0.058	151	Oblong <sup>2</sup>	Open2	Erect <sup>2</sup>	Smooth3	0-G <sup>3</sup>
daho Fescue, Syn 'C'	380	0.060	13	Oblong	Open	Erect	Smooth	0-G
Covar', Sheep Fescue	330	0.020	9	Tapering	Compact	Erect	Smooth	В-С
Durar', Hard Fescue	282	0.117	15	Oblong	Int	Erect	Hairs	L-G
Biljart', Hard Fescue	576	0.027	9	Oblong	Int	Nodding	Hairs	Purple
Scaldis', Hard Fescue	300	0.047	16	Egg	Int	Nodding	Smooth	Purple
Pennlawn', Cr. Red Fescue	263	0.145	21	Oblong	Open	Nodding	Smooth	Green
Dawson' Cr. Red Fescue	473	0.063	11	Oblong	Int	Nodding	Smooth	Green
Boreal', Cr. Red Fescue	474	0.085	19	Oblong	Int	Erect	Smooth	Purple
Jamestown', Ch. Red Fescue	373	0.089	13	Narrow	Compact	Nodding	Smooth	Purple
Cascade' Ch. Red Fescue	271	0.071	13	Oblong	Open	Nodding	Hairs	P-GR
Highlight' Ch. Red Fescue	379		14	Oblong	Compact	Erect	Smooth	YL-G

<sup>1</sup> Av. Length/Plant
2 At Medium Dough Stage
3 At Maturity; O-G = olive-green, B-G = blue-green; L-G = light-green, YL-G = yellow green

3400003

Table 5. Comparative Seed Data of Idaho Fescue with Other Grasses

		Seed Weight		Lemma				Palea
Cultivar	Plant	Panicle	1000	Length	Width	Hairs	Awns	Hairs
	g	g	g	mm	-mm-	-est-	-mm-	-est-
Idaho Fescue, Syn 'A'	14.2	0.058	1.10	5.78	•97	11	2.86	12
daho Fescue, Syn 'C'	12.7	0.082	.89	6.9	1.2	1	3.88	3
Secar', Bluebunch Wheatgras	s		2.83	8.06	1.20	1	6.96	1
Covar', Sheep Fescue	6.9	0.021	0.44	3.76	0.54	2	1.42	2
Durar', Hard Fescue	47.6	0.117	0.82	5.3	0.83	2	2.04	1
Biljart', Hard Fescue	15.8	0.027	0.80	5.04	0.87	2	1.94	1
Scaldis', Hard Fescue	-	0.047	0.79	4.88	0.82	2	2.54	2
Pennlawn', Cr. Red Fescue	39.1	0.145	1.23	5.9	0.87	1	2.38	2
Dawson', Cr. Red Fescue	29.6	0.063	1.05	5.2	0.87	1	1.74	1
Boreal', Cr. Red Fescue		0.085	1.62	6.76	0.97	1	3.22	2
Jamestown', Ch. Red Fescue		0.089	0.97	5.10	0.78	1	1.70	2
Cascade', Ch. Red Fescue	19.3	0.071	1.05	5.11	0.90	3	2.11	2
Highlight'Ch. Red Fescue	-	_	1.09	5.3	0.98	3	1.86	2

<sup>1 =</sup> Absent, 2 = Several, 3 = Many

<sup>2 =</sup> Absent, 2 = Short, 3 = 1ong

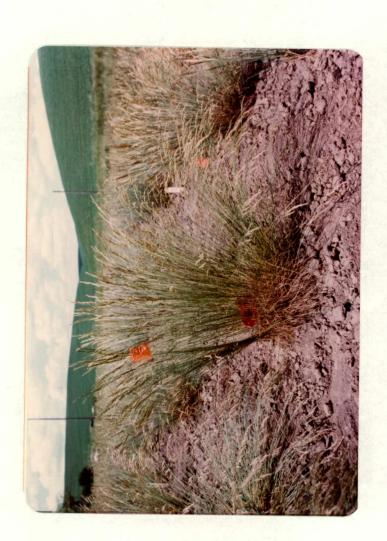
1.7

Table 6. Comparative Seedling Characteristics of Idaho Fescue With Other Grasses

0.1.1		Coleoptile		Second	First	Roc	ot
	Emergence	Length	Color	Leaf	Leaf	Length	Score
	days	mm	-est-	-days-	-mm-	mm	-est-
Idaho Fescue, Syn 'A'	5	5.2	Reddish Brown	1 112	32.23	17	6.0
Idaho Fescue, Syn 'C'	5	5.4	Purplish Brow	n 6	28	30	8.0
'Secar' Bluebunch Wheatgrass	5	7.8	Purple	10	99	24	8.0
'Covar', Sheep Fescue	7	4.1	Greenish Brow	n 8	29	20	6.0
'Durar', Hard Fescue	7	4.7	Green	8	40	17	7.0
'Biljart' Hard Fescue	7	4.9	-	8	37	15	6.0
'Scaldis', Hard Fescue	7	3.5	Cream	11	34	22	7.0
'Dawson' Cr. Red Fescue	7	5.3	Greenish Brown	n 8	33	21	6.0
Jamestown', Ch. Red Fescue	7	5.3	Light Green	11	30	23	7.0
'Cascade,' Ch. Red Fescue	7	5.9	Greenish Brown	n 11	38	21	7.0

<sup>1</sup> Visual estimation
2 Days until emergence of second leaf
3 Length of first leaf at emergence of second leaf

FIG. 1. TYPICAL IDAHO FESCUE SPACE PLANT.



SYNTHETIC ISOLATION NURSERY SYN 'A' JOSEPH 7/77 ENGINE BOND

ENGINE

ENGIN

EN

8-1



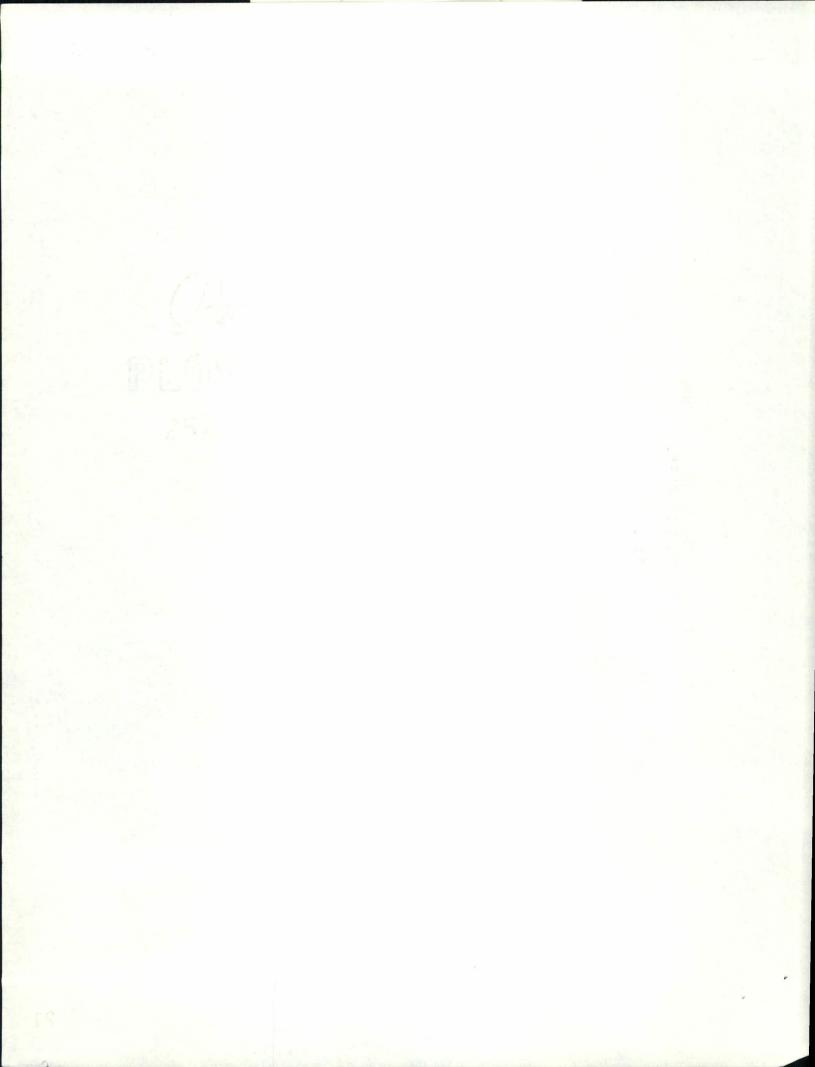
PLAYER BOOKS

# IDAHO FESCUE PANICLE COMPARISONS WITH OTHER FESCUES.

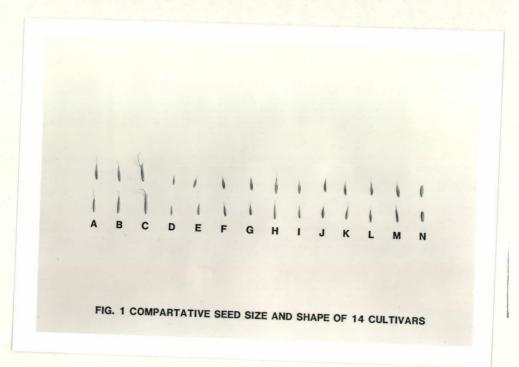
FIG. 6











- A. 'JOSEPH' IDAHO FESCUE
- B. 'NEZPURS' IDAHO FESCUE
- C. 'SECAR' BLUE BUNCH WHEATGRASS
- D. 'COVAR' SHEEP FESCUE
- E. 'DURAR' HARD FESCUE
- F. 'BILJART' HARD FESCUE
- G. 'SCALDIS' HARD FESCUE

- H. 'PENNLAWN' CREEPING RED FESCUE
- I. 'DAWSON' CREEPING RED FESCUE
- J. 'WINTERGREEN' CHEWINGS RED FESCUE
- K. 'JAMESTOWN' CHEWINGS RED FESCUE
- L. 'KOKET' CHEWINGS RED FESCUE
- M. 'CASCADE' CHEWINGS RED FESCUE
- N. 'ALTA' TALL FESCUE